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**TITLE OF THE INVENTION**

**CONSTRUCTION RESIDUE TRANSPORT SYSTEM**

## **FIELD OF THE INVENTION**

This invention relates to the field of containing and removing residue from a construction site to a recycle center or dumpsite. And, more specifically, to the removal of the residue from the cleanup process of the concrete pumps and concrete ready mix delivery trucks or other similar materials or mixers at construction sites by means of a unique portable construction residue transport system. The term residue in this patent primarily refers to the composite cement, sand and gravel that remains in the pump, pump hoses, the ready mix delivery truck barrel and the shoots used to disperse the mixture. Additionally there are the hand tools and the outside surfaces of the equipment that  
10 require wash-down. On occasion, there is a small quantity of the mixture left in the equipment that is not needed and this overrun must be disposed of on-site. Other mixtures and construction equipment cleanup, such as masonry mortar mix and plaster mix, may equally fall into the category of the construction residue referred to within this patent.

## **BACKGROUND OF THE INVENTION**

This invention describes a new and unique system for the containment and transport of the residue from the cleanup of the concrete pumps and concrete ready mix delivery trucks at construction sites. The common practice in the past at construction sites  
20 has been for operators of concrete pumps and concrete ready mix delivery trucks, after they are finished, to washout and dump the excess concrete residue and wash-down water on the ground. After the material is hard, the solids are broken up and hauled off and the liquids are allowed to be absorbed into the ground. In some cases the solids may be

spread by heavy equipment to a granular material and mixed with the soil for fill. With the increasing awareness of environmental controls and the confinement of construction projects, places to put this residue have become scarce and the amount of concrete being used on these sites has increased greatly. Dumping this material where all or any part of it will get into the storm drain system has been found to be a major problem. Construction projects in the inter-city and freeway areas present the greatest problems for the cleanup and removal of this residue. The process of recycling materials has developed where the concrete residue from construction sites can be reprocessed into usable materials.

10 Additionally plaster, masonry mortar mixes and other similar materials along with the mixer cleanup materials must also be removed from construction sites and requires a similar disposal process. It is common for a scum, consisting of concrete chemicals and fine particulates, to accumulate on the surface of the wash-down water. This material becomes extremely slippery when it is on the surface of the ground. On construction projects during the winter or when it is raining the residue from the cleaning and dumping process gets even worse when the wash-down water and the rain water accumulates in low areas on the ground and is extremely hard to handle. The material is slippery and can harden after a period of time without construction personnel being aware of where it is located. Accordingly, it is always best to keep the rainwater from mixing with the wash-down water and residue mixture if possible.

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#### **REFERENCES CITED**

Patent No. 4,144,979 of Clayton R. Leach Jr. et al. describes a generally rectangular shaped beaver tail platform that is supported in inclined relation from the rear

end portion of a trailer. Locking elements on the beaver tail platform and trailer releasably lock the beaver tail platform on the trailer. Ramp members are pivotally mounted on the rear end portion of the beaver tail platform.

This patent describes the structure at the rear of the bed of a truck that inclines downwardly to be connected with conventional ramps to roll vehicles onto the bed of the truck. The ramps are separate from the truck and are stored by inserting members into slots in the inclined area. Although this patent teaches a ramp member, it does not relate to the storage or removal of materials from a construction site.

10 Patent No. 4,694,972 of Michael Bimonte et al. discloses an apparatus for use in refuse collection and disposal that comprises a base adapted for securement to a substrate and for releasable receipt of a non-self-standing liner. The base includes an upstanding frame having an uppermost opening for receipt of the liner, the frame being configured such as generally to preclude the base from use for containment of refuse of customary small size in the absence of residence of the liner therein.

This patent describes a cylindrical device with a conical base designed for refuse collection and disposal. The structure of this device would not lend itself to the containment of the materials involved with the wash-down of concrete pumps and concrete ready mix delivery trucks which hardens and most often requires the removal in a solid state from the container.

20 Patent No. 5,289,937 of Gerardus A. M. Boots, additionally describes a container that is comprised of a relatively stiff, form-retaining supporting frame and a flexible shell member. The supporting frame comprises a polygonal bottom member and a corresponding cover member. Each angular point of the bottom member is connected

with an angular point of the cover member by means of a rod-shaped element. The flexible shell member is connected with each rod-shaped element by means of a flexible loop member. Each loop member starts from a point of attachment to the shell member and passes around a rod-shaped element to a second point of attachment. The arrangement is such that the loop members keep the shell member within the outer boundaries of the supporting frame at all times, at least if the shell member contains goods to be packaged. According to the invention, a strip-shaped member made from a flexible material is connected with the shell member at the points of attachment. It has a length at least equal to that of a rod-shaped element and a width greater than that of the shell member between two points of attachment. The associated rod-shaped element  
10 extends between the member and the strip-shaped member.

This patent deals with a tubular framework supporting a flexible material to be used as a container. This device will not support the weight of the residue from the cleanup of the concrete pumps or the concrete ready mix delivery trucks.

Patent No. 5,639,129 of Roger R. Lindley discloses a door latch and sealing assembly associated with a waste container having an open end and at least one door positioned adjacent to and overlying the open end. The assembly includes a tapered seal actuator, and a seal actuator drive mechanism associated with the seal actuator and adapted to drive the seal actuator. A receiver is rigidly attached to the container and is  
20 adapted for operable engagement with the seal actuator. An elastomeric gasket is positioned between the open end and the door. In operation, extension of the seal actuator drive mechanism causes the seal actuator to engage the receiver; the receiver then

reactively imparts to the seal actuator a compressive force on the door sufficient to establish a liquid-tight or hermetic seal.

This patent discloses a door latch and sealing assembly associated with a waste container. It does not specify the particular construction residue transport system or the unique features herein disclosed.

Patent No. 6,076,693 of William P. Reiter et al, tells of a container assembly for transporting bulk materials that includes a molded, one-piece completely integral non-metallic container insert and a frame supporting the container insert. The container insert can be molded of polyolefin. It can include walls having varying thickness, a bottom wall  
10 having a thickness greater than the sidewalls, and/or reinforcing structures molded within the walls. The container assembly can be constructed to provide a substantially enclosed tank, a roll-off container, intermodal container, fixed truck box, or dump truck box.

This patent tells of a container assembly for transporting bulk materials that includes a molded, one-piece completely integral nonmetallic container insert and a frame supporting the container insert. This patent refers to an insert that is molded out of polyolefin or similar non-metallic material to fit into conventional containers like a roll-off container, intermodal container, fixed truck box, or dump truck box. The device is designed to take the shape of conventional containers and has not been designed with any unique features or for any specific purposes.

20 Patent No. 6,152,672 of William B. Alson teaches of a waste container system comprised of at least one enclosed treatment cart including a plurality of wheels disposed therefrom for rolling the treatment cart, wherein the treatment carts have at least one sealed door to allow waste to be placed inside the treatment carts wherein at least one of

the treatment carts is capable of being treated by a treatment process without having to first empty the contents of the treatment cart prior to the treatment process and a transport container capable of being transported by a tractor trailer with an open top side and at least one opening in a side wall covered by a door wherein the transport container is capable of receiving one or more treatment carts through the opening. In accordance with another embodiment of the present invention, a treatment cart is capable of being treated by an autoclave process, or a microwave process or a chemical sterilization process.

This patent teaches of a waste container system comprised of at least one enclosed treatment cart where the contents are processed before being removed from the container.

- 10 It has been designed specifically to contain, transport, and hold during the decontaminating process, dangerous environmental waste, such as medical bio-hazardous waste and has no similarities to the construction residue transport system.

Thus there is a continuing need for improving the environment at construction sites and holding and removing contaminating construction materials to a recycle center where they may be processed and reused.

- In this respect, before explaining at least one embodiment of the invention in detail it is to be understood that the invention is not limited in its application to the details of construction and to the arrangement, of the components set forth in the following description or illustrated in the drawings. The invention is capable  
20 of other embodiments and of being practiced and carried out in various ways. Also, it is to be understood that the phraseology and terminology employed herein are for the purpose of description and should not be regarded as limiting.

## SUMMARY OF THE INVENTION

The preferred embodiment of this invention consists of a construction residue transport system consisting of a container that in the preferred embodiment would be transported by means of a roll-off box transport truck and in the alternate embodiment would be a smaller unit set up on wheels as a trailer system for small jobs. In the roll-off box configuration the device will incorporate a container consisting of a tubular steel framework with a contoured sheet metal bed and a contoured polymer liner. A watertight steel door or tailgate, sealed by means of a conventional O-ring seal and toggle clamp mechanisms commonly used in this field, will open by means of a hinge located on any  
10 one of the four structural members at the back of the container. The watertight steel door or tailgate will be considerably higher than the central framework of the container to endeavor to keep material from coming out while the device is being transported and while it is being tipped up for placement on the roll-off box transport truck. Two angular braces support the upper portion of the door framework and are covered with triangular polymer panels to additionally aide in keeping material from coming out during transport and also when it is placed on the roll-off box transport truck.

The container bed framework, consists of the rear steel side structural members along with top and bottom steel structural members attached to the square tubular steel side rails. Two extended support legs connected to the tubular steel side rails are  
20 equipped with flat shoes to keep the legs from sinking into the ground.

Two steel central frame members extend from the rear structure beneath the container bed past the front wall to incorporate a non-slip steel grating and two steel rollers used to convey the device onto the conventional roll-off box style of transport



truck. A hook is welded to a flat steel plate to be used to attach the winch cable when loading the device on the conventional roll-off box style of transport truck. A second set of steel rollers at the distal end of the steel central frame members adjacent to the rear structure are used to support the back of the device when sitting on the ground. Two crane hoist brackets are welded to the angular braces along with being welded to the tubular steel side rails at the back of the device. Two additional crane hoist brackets are welded to the tubular steel side rails adjacent to the extended legs at the front of the device. The lower ends of all the crane hoist brackets have been bent around and welded to the lower surface of the tubular steel side rails for additional support. A contoured sheet metal bed is welded to the rear steel side structural members, the bottom steel structural member, the two tubular steel side rails and the front wall, creating a sealed container when the water tight door or tailgate is tightly closed. The contoured sheet metal bed is covered with a conforming contoured sheet of a polymer material to create a surface that the concrete residue will not stick or adhere to. The perimeter of the polymer material will be caulked to maintain a watertight seal. It further must be understood that there are a variety of coatings that can be applied to the surface of the configured sheet metal bed to produce a non-stick surface and are anticipated to be within the scope of this patent.

The elevated area of the rear structure that has been designed to keep materials from coming out during transport supplies a location to mount the back clevis used to attach a rope or strap. The rope or strap translates between the back clevis and the front clevis so that when a tarp is covering the container bed the water will be shed down and to the sides.

An alternate embodiment of the front wall of the construction residue transport system incorporates a weir and gutter to transport the excess water or residue to a filtration reservoir. A variety of disposable filter materials can be installed into the filtration reservoir to trap the scum consisting of concrete chemicals and fine particulates with the filtered water to be put into containers and reused or to be allowed to go onto the ground.

The alternate embodiment of the construction residue transport system will be used as a mobile trailer unit on wheels. The device will employ all the attributes of the construction residue transport system with the addition of the conventional dropped axles  
10 to maintain a minimum height. The back door or tailgate will hinge from the top steel structural member. Adjustable jack stands will be at the four corners of the device.

With respect to the above description then, it is to be realized that the optimum dimensional relationships for the parts of the invention, to include variations in size, materials, shape, form, function and manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the present invention.

Therefore, the foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to  
20 those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

## **THE OBJECTS OF THE INVENTION**

The object of this invention is to create a by means to contain and transport construction residue from construction sites.

Another object of this invention is to create a by means to contain and transport residue from the cleanup of concrete pumps and concrete ready mix delivery trucks away from a construction site to a recycle center.

Another object of this invention is to create a by means to contain and transport residue from the cleanup of concrete pumps and concrete ready mix delivery trucks away  
10 from a construction site to a recycle center with a back door or tailgate on the device enlarged enough to keep the material from coming out on the road when being transported.

Another object of this invention is to create a device with sealed angular supports for the back door or tailgate that will prevent material from going out the sides when the device is tipped during the loading process of placement on a roll-off style transport truck.

Another object of this invention is to create a device that will hold the residue from the cleanup of concrete pumps and concrete ready mix delivery trucks and can be loaded onto a roll-off box style of transport truck.

20 Another object of this invention is to create a container that can be easily sealed with a tarp over a strap that diverts rainfall to the sides of the device.

Another object of this invention is to create a device that will hold the residue from the cleanup of concrete pumps and concrete ready mix delivery trucks and allow the material to slide out easily after it has reached a solid state.

Another object of this invention is to create a device that will have a weir and gutter system to separate the water and scum off the top of the residue and drain it through a filtration mechanism.

Another object of this invention is to create an area with non-slip steel grating where the operators of the concrete pumps and concrete ready mix delivery trucks can safely stand when cleaning their equipment.

10 Yet another object of this invention is to create a device that can be adapted with ramps for the trucks to drive up on to elevate them for the cleaning process.

A further object of this invention is to create a device that can be adapted at a smaller scale as an integrated trailer unit to be pulled on it's own wheels by a truck to smaller construction sites.

A final object of this invention is to clean up the environment at construction sites and remove reusable materials to recycle locations.

These together with other objects of the invention, along with the various features of novelty, which characterize the invention, are pointed out with particularity in the claims annexed to and forming a part of this disclosure. For a  
20 better understanding of the invention, its operating advantages and the specific objects attained by its uses, reference should be made to the accompanying drawings and descriptive matter in which there are illustrated preferred embodiments of the invention.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

The accompanying drawings, which are incorporated in and form a part of this specification, illustrate embodiments of the invention and together with the description, serve to explain the principles of this invention.

Figure 1 depicts a perspective view of the preferred embodiment of the construction residue transport system with the watertight door or tailgate partially open.

Figure 2 depicts a perspective view of the alternate embodiment of the front wall with the weir and gutter system to the filtration area.

10        Figure 3 depicts a front elevation view of the preferred embodiment of the construction residue transport system with the front wall broken away to clarify the side support structure.

Figure 4 depicts a side elevation view of the preferred embodiment of the construction residue transport system.

Figure 5 depicts the construction residue transport system with the truck ramp adaptation.

Figure 6 depicts a section through the side support structure.

Figure 7 depicts the construction residue transport system covered by a tarp.

20        Figure 8 depicts an alternate embodiment of the construction residue transport system as a mobile trailer unit.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, wherein similar parts of the invention are identified by like reference numerals, there is seen in Figure 1 a perspective view of the preferred embodiment of the construction residue transport system 10A with the watertight door or tailgate 12 partially open at the back of the container bed 14. The watertight door or tailgate 12 is shown pivoting from the side by means of a hinge 16. It must be understood that the watertight door or tailgate 12 can pivot from any one of the rear steel side structural members 18 or 22 or the top or bottom steel structural members 20 and 24 attached at the rear of the container bed 14 and still remain within the intent of this patent. The watertight door or tailgate 12 is sealed by means of a typical conventional O-ring seal and toggle clamping mechanism or any other commonly used mechanism in this field. The container bed 14 framework, consists of the rear steel side structural members 18 and 22 along with top and bottom steel structural members 20 and 24 attached to the square tubular steel side rails 26 and 28. Angular braces 30 and 32 gives added support to the enlarged rear structure 34. Two extended legs 38 and 40 are connected to the tubular steel side rails 26 and 28 and support the front or proximal wall 36A of the container bed 14. Flat shoes 42 and 44 keep the legs 38 and 40 from sinking into the ground. Two steel central frame members 46 and 48 extend from the rear structure 34 beneath the container bed 14 to extend past the front wall 36A to incorporate a non-slip steel grating 50 and two front steel rollers 52 and 54 used to convey the device onto the conventional roll-off box style of transport truck. Hook 56 is welded to the flat steel plate 58 to be used to attach a winch cable when loading the device onto a conventional roll-off box style of transport truck. A second set of steel rollers 60 and 62

at the distal end of the steel frame members 46 and 48, adjacent to the rear structure 34, as clearly depicted in Figures 3 and 4, are used to support the back of the device when sitting on the ground. Two crane hoist brackets 64 and 66 are welded to the angular braces 30 and 32 along with being welded to the tubular steel side rails 26 and 28 at the back of the device. Two additional crane hoist brackets 68 and 70 are welded to the tubular steel side rails 26 and 28 adjacent to the extended legs 38 and 40 at the front of the device. The lower ends 72 of all the crane hoist brackets 64, 66, 68 and 70 have been bent around and welded to the lower surface of the tubular steel side rails 26 and 28 for additional support. A contoured sheet metal bed 74 is welded to the rear steel side

10 structural members 18 and 22, the bottom steel structural member 24, the two tubular steel side rails 26, 28 and the front wall 36A creating a sealed container bed 14 when the watertight door or tailgate 12 is tightly closed. The contoured sheet metal bed 74 is covered with a conforming contoured sheet of a polymer material 76 to create a surface that the concrete residue will not stick or adhere to. The perimeter of the polymer material will be caulked to maintain a watertight seal. It further must be understood that there are a variety of coatings that may be applied to the surface of the configured sheet metal bed 74 to produce a non-stick surface. Additional triangular sections 78 and 80 of the polymer material cover the angular braces 30 and 32 to retain any of the residue when the device is tipped up for placement onto the roll-off box style of transport truck. The

20 elevated area of the rear structure 34 has been designed to keep materials from coming out during transport and to mount the back clevis 82 to attach a rope or strap 84. The rope or strap 84 translates between the back clevis 82 and the front clevis 85 so that when the

tarp 86 is covering the container bed 14 the water will be shed down and to the sides as clearly illustrated in Figure 7.

Figure 2 depicts a perspective view of the alternate embodiment of the front or proximal wall 36B of the construction residue transport system 10A with a weir 88 and gutter 90 to transport the excess water and scum to the filtration reservoir 92. A variety of disposable filter materials can be installed into the filtration reservoir 92 to trap the scum consisting of concrete chemicals and fine particulates. The filtered water can to be put into containers and reused or be allowed to go onto the ground.

Figure 3 depicts a front elevation of the preferred embodiment of the construction residue transport system 10A with the front wall 36A broken away to clarify the side support structure. Figure 6 depicts a section through the side support structure illustrating the tubular steel side rail 26 with the crane hoist bracket 68 welded in place. The contoured sheet metal bed 74 and the contoured polymer material 76 are shown in cross section attached by means of a bolt 94 threaded into the tubular steel side rail 26. An angular flashing 96 covers both sides of the container bed 14 where the polymer material 76 and the contoured sheet metal bed 74 attach to the side of the tubular steel side rails 26 and 28 to prevent the intrusion of any of the residue materials between the layers.

Figure 4 depicts a side elevational view of the preferred embodiment of the construction residue transport system 10A clarifying the location of the back steel rollers 60 and 62. A pull off hook 98 is welded to the bottom steel structural member 24 to be used to pull the device off the roll-off box style transport truck.

Figure 5 depicts the construction residue transport system 10A with the incorporation of truck ramps 100 attached to the front wall 36A and the steel frame



members 46 and 48 to allow the trucks to drive up on to elevate the shoots and open end of the concrete mixing barrel. The truck ramps 100 are depicted in two parts, the attached section 102 and the pivoting section 104 in the deployed state and in the stored state, folding by means of the hinge 106.

Figure 8 depicts an alternate embodiment of the construction residue transport system 10B as an integrated mobile trailer unit 110 on wheels 112. The device will employ all the attributes of the construction residue transport system 10A with the addition of the conventional dropped axles to maintain a minimum height. The back door or tailgate 12 will hinge from the top steel structural member 20. Adjustable jack stands 114 will be at the four corners and the device will be towed with a conventional trailer hitch 116.

The construction residue transport systems 10A and B shown in the drawings and described in detail herein disclose arrangements of elements of particular construction and configuration for illustrating preferred and alternate embodiments of structure and method of operation of the present invention. It is to be understood, however, that elements of different construction and configuration and other arrangements thereof, other than those illustrated and described may be employed for providing a construction residue transport systems 10A and B in accordance with the spirit of this invention, and such changes, alternations and modifications as would occur to those skilled in the art are considered to be within the scope of this invention as broadly defined in the appended claims.

Further, the purpose of the foregoing abstract is to enable the U.S. Patent and Trademark Office and the public generally, and especially the scientists,

engineers and practitioners in the art who are not familiar with patent or legal terms or phraseology, to determine quickly from a cursory inspection the nature and essence of the technical disclosure of the application. The abstract is neither intended to define the invention of the application, which is measured by the claims, nor is it intended to be limiting as to the scope of the invention in any way.